



# **Information and Communication Technology in the Health Field in the LAC Region**

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## Introduction and global context of health and development

The constant threat that communities face due to the manifestations of inequalities in health, are accompanied by inequalities in access to information and communication technology. In the Millennium Development Goals, the World Health Organisation calls for broad access to information and communication technology as means of achieving the same goals. The framework for the group of actions related to the global eHealth strategy<sup>1</sup>, *is oriented to ensure the leadership and facilitation role in international cooperation, political coordination and an effective government in health*. In order for this to happen it is essential, among other things, to have human resources that can involve themselves in a global strategy, with the approach of a knowledge-based society.[1]

The Economic Commission for Latin America (CEPAL), considers the state of and the future of the digital divide in the region to be more serious than in the rest of the world. Even still, this institution proposes eHealth as was a way to contribute to the improvement of health services and the reduction in the incidence of avoidable diseases and premature deaths. However, the Commission expresses that *it is not satisfactory to base programs on models from developed countries when debating the processes that lead to the transition to an information society in the region, since it is clear that conditions in these countries are very different. With regards to the existing reform process, it is obvious that eHealth must be an integrated part of the regional health sector reforms* [2], even if in practice, this is not necessarily the case.

The Harvard Forum on ICT and the Reduction of Poverty established fundamental lines of thinking from varied and critical perspectives which help lay out a focus for analysing the current and future role of information and communication technology in alleviating the difficulties created by poverty in an objective and concrete manner. In "ICT4HEALTH", L. Chen expressed the *potential benefits of the management and application of knowledge and its impact on the state of people's health and the health of social groups*. The leadership role stands out as key to assuring an equitable distribution of these technologies. [3]

Health is an expression of the development of communities. The health sector in Latin America and the Caribbean has not been spared from the delay in the introduction of information technology, whereas other areas of the economy and business have achieved a rapid integration of processes through the use of technology in their daily work. The Internet has advanced

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<sup>1</sup>*eHealth, online health, electronic health, network health* is the area characterized by the combined use of information and communication technology (ICT), to transmit, store and recover data with clinical, administrative and educational objectives, as much locally as at a distance. Specifically, it refers to the use of Internet technologies in health. According to the WHO, eHealth is much more than just the application of technology for the provision of health services, since it includes the adoption and use of ICT for the development of health systems to create wider access for the public to health information and education.

the most and at a greater speed and to a greater reach in the area of finance, economics and some areas of science, than in the health sector whose spread of processes has not occurred under equal circumstances.

The digital divide has represented a state of constant difficulties for social diffusion and the cognitive appropriation of information and communication technology, but on the other hand it is said that the higher income level of social groups facilitates internet access in the community.

According to recent statistics, the market for information and communication technologies in health stands at 45 billion with the United States accounting for 25 billion alone. In the framework of the globalization of goods and services, it is essential to consider the current and future impact of the participation of initiatives in this area.

With regards to regional and sub-regional commercial treaties, we see that just like in the negotiation of products, goods and services directly and indirectly related to technology and their specific application in business or in the provision of health services, it is necessary to participate in the different negotiation tables such as the current negotiation of the free trade agreement (FTA) that Colombia, Ecuador and Peru are negotiating with the United States. The negotiation tables on "Telecommunications", "Health", and "Transborder Services" are intimately linked with the work of deploying ICT in health.

We should not see the World Wide Web as something vague. The Internet is set up as a distributed and shared universe in the area of health, and as an expression of human development and the wellbeing of nations. It is also the closest contact to the final user. We will always have the worry about whether available resources are what are necessary to meet the needs of vulnerable communities, and if vulnerability will become a permanent state or is a temporary state. We cannot forget that one thing is the connectivity of nations in a globalized world, and another very different thing is access to "contextual" information, which is intelligent and has the human resources and information at its disposal to provide answers to health needs and expectations.

If one person in a vulnerable social group can have access and manage information to change their perspective on health microcosms and thereby change a pattern of behaviour that has been and is harmful to their health and the people around them, this will generate a contribution to human development strictly related to social outcome and the corresponding health outcome.

How can the distributed environments facilitated by ICT contribute to the improvement of access to medical knowledge, information and intelligence in the management of medical assistance to populations with fewer resources which are in a state of social and economic inequity which places them in a situation of greater vulnerability in the face of illness?

In the LAC region, we are living in a time of huge social problems and great challenges and opportunities. With regards to technological developments, there is a joining of intentions, interests and local and regional developments, which favour the environment generated by the “Wave of Telemedicine, Telehealth and eHealth” as noted in the increase in the number of professional, interest groups and organizations promoting the application of ICT in health over the last three years. Among these groups it is necessary to mention the constitution of the Telemedicine Chapter for Latin America and the Caribbean, which belongs to the American Telemedicine Association (ATALACC), as well as the participation of several countries in the region in the International Society for Telemedicine and eHealth. Additionally, efforts are currently being made at the Iberoamerican level to create an eHealth and Centres of Excellence network, supported by organizations such as the World Health Organization, the Centre for Global eHealth Innovation and eHealth Magazine (Revista eSalud).

The health problems and healthcare system problems in each of the LAC countries must now be clearly defined in order to orient towards alternative solutions based on the incorporation of ICT. We cannot continue to have situations where the application of the technologies is presented as a solution to non-problems.

Health provision problems in the case of vulnerable populations are as broad as the provision of health services itself. For a better understanding of these cases, it is important to consider that on one side you have the communities themselves, while on the other side, you must consider the aspects related to the group of resources of the prevailing social structure, the health system of the countries or the region in which the community is located, as well as the group of available or unavailable human resources to assist in the healthcare needs or demands of the people. [4]

These communities generally have high levels of unsatisfied basic needs and poor basic health indicators. They also have difficulty accessing a good level of healthcare, since services have opportunity and quality problems.

There is a group of problems related to health resources which includes the fact that health care professionals are often concentrated in urban areas and resources from all levels of assistance are also concentrated generally far from the populations most unattended and in need. Similarly, in remote locations the group of professionals located with vulnerable groups requires support and accompaniment in the management of health problems in the population in which they work. They also require continuing education to permit them to have up to date training in order to interact with other health professionals and the community, and in order to provide solutions to the prevailing health problems in these populations.

The problem itself is not the technology, be it information, communication or other type. The problem is made up of people in different levels in society who due to our paradigms do not allow for innovative methods to be presented as answers to the old problems of scarcity of resources and human development limitations.

### **Brief description of the global use of ICT for prevention and health assistance**

In this section some successful cases will be presented of the introduction of available ICT alternatives into the daily practices of health professionals, and in some cases into the routines of the users of different healthcare provision scenarios. Studies undertaken in the province of Quebec, Canada have explored public perception about the application of telehealth, as a demonstration of the application of information and communications technology. Around half of the 1242 people surveyed by telephone agreed with being attended through telehealth and the factors that carry weight in favour of this service include knowing the benefits and barriers of telehealth as well as being a woman. The study showed *the need to establish a global education strategy aimed at the public in order to emphasize the benefits of telehealth and its legal and ethical aspects*. [5]

In circumstances of vulnerability in remote locations far from specialized resources, as in case of the study of the application of telemedicine between healthcare service providers in the Magdalene Islands, the results show that telemedicine is considered *an acceptable form of providing specialized services and the deployment of these programs requires a more structured focus*. It is clear that the diffusion process for ICT applications in health requires even more planning than pilot projects. [6]

### **Specific description of the use of ICT to improve the health situation of poor and vulnerable populations in Latin America. Data and basic indicators.**

The database of projects of the Institute for Interconnectivity in the Americas, which includes ongoing ICT projects in the health field, includes information on 79 assorted projects on its website [7]. These projects have the following objectives:

- Virtual communities, thematic networks, the facilitation of the exchange of information 36%
- Education support and health training 22.8%
- Virtual library development 19%
- Platforms or networks to assist rural communities 15.2%
- Other projects related to providing information on healthcare system reform 5.1%

The majority of the projects reported in the category of platforms or networks to assist rural communities make reference to cases where in one way or another they are trying to incorporate applications of information and

communication technology in social, cultural, or geographic communities that are to some degree vulnerable. Among these projects, the EHAS project (Hispanic American Health Link)<sup>2</sup> is found. Its purpose is to demonstrate that the adequate use of ICT improves the primary health care system in rural areas in Latin America. In order to do this it resorts to combined voice and data communication systems of health information, through the use of e-mail and radio signals. This development of low-cost communications systems, with access to services and information for primary assistance, has projects in Peru, Colombia and Cuba.

Interestingly, the EHAS project includes technical feasibility studies and impact evaluation which show an improvement in resolution capacity of the healthcare centres, through the teleinformation of the human resources involved and from inter-consultations to solve uncertain cases or treatments. It has also contributed to the improvement of evacuation procedures of patients and the quality of information for epidemiological observation and accompaniment of professionals located in remote areas that find themselves in isolating circumstances.

In Mexico, developments in eHealth strategies have achieved a position of importance. There is the case of Anáhuac University<sup>3</sup> which through applications of telemedicine, telehealth and long distance education is connecting health professionals and users from unattended geographic areas as well as indigenous groups and peasants in the State of Guerrero.

In the Caribbean region, the Dominican Institute of Telecommunications (INDOTEL)<sup>4</sup> telemedicine project stands out. It covers almost 3 million people with a regional reach of 14 of the country's provinces, using communications components such as radio, teleconferencing systems and access to Internet for the hospitals on the network, with multiple benefits for health professionals and the healthcare system in general.

The National Telemedicine Plan in Panama is currently developing a project to bring remote assistance and support to health professionals, as well as indigenous communities through the use of radios and mobile telephones.

In the south of the region, the telemedicine network established by the National University of Colombia<sup>5</sup>, connects distant geographic areas to the capital of Bogota and San Andres Island in the Caribbean in a pilot project called Apaporis-Amazonas.

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<sup>2</sup> <http://www.ahas.org>. Visited 27 October, 2005.

<sup>3</sup> <http://www.anahuac.mx/fundacion/telemedicina.html/>. Visited 27 October, 2005.

<sup>4</sup> <http://www.indotel.gov.do>. Visited 28 October, 2005.

<sup>5</sup> <http://www.unal.edu.co/telemedicina/bioTelemedicina.html#>. Visited 28 October, 2005.

In Ecuador, the work of CINTERANDES<sup>6</sup> has developed models of telemedicine and mobile networks which offer medical and surgical attention to populations in remote locations. These developments which resulted from the collaborative work between the Ecuador Equinoccial University<sup>7</sup> and the Telehealth Centre at the University of New Mexico have helped establish service models incorporating telemedical boats to help assist professional and communities in remote areas and with considerable vulnerability components.

In Chile the Telemedicine Network for pediatric support is a system of interactive communication through internet technologies, which connects healthcare service assistance networks with hospitals and the primary attention network.

Brazil and Colombia form part of Tal@med<sup>8</sup> which permits the exchange of health information and the use of remote devices for the collection and analysis of samples.

The Protection System of the Amazons (Sistema de Protección del Amazonas), the Federal University of the State of Amazonas (La Universidad Federal del Estado de Amazonas) and the University of Sao Paulo (Universidade de Sao Paulo) with its Discipline in Telemedicine are currently involved in the project known as Amazon Telemedicine Zone (Polo de Telemedicina del Amazonas) through which all of the facilities and the resources of the area are integrated to develop strategies which lead to the incorporation of ICT between health professionals and the communities in that corner of the world. [8], [9] and [10].

In the area of existing regulations relating to the application of ICT in health, we take the case of Colombia, where the Ministry of Social Protection with the support of the Panamerican Health Organization (Organización Panamericana de la Salud-OPS) are working to standardize how health institutions offering telemedicine services are set up and accredited. This work which includes the participation of academia and groups of actors in different areas involved in telemedicine, has resulted in Resolution 2182 (July 9 2004) which consists of a normative and regulative group, with instruments which permit the analysis of the conditions of each telemedicine provider in the spheres of:

- Human resources,
- Equipment and maintenance of equipment,
- Priority assistance processes,
- Clinical records and assistance records,
- Interdependence of services, and
- Risk monitoring.

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<sup>6</sup> <http://www.cinterandes.org>. Visited 28 October, 2005.

<sup>7</sup> <http://www.istec.org/events/ga2004/results/presentations/Hidalgo.pdf>. Visited 29 October, 2005.

<sup>8</sup> <http://www.alis-telemed.net>. Visited 27 October, 2005.



Additionally, this regulatory resolution includes a verification table of the minimum values for the use of diagnostic images. [11]

**Specific case analysis, sub-regional particularities, distinct strategies and instruments, involved actors, initiatives to maintain and innovations that must be undertaken**

Ideally the analysis of the successful and unsuccessful cases of the incorporation of some of the information and communication technologies must come from the people who have directly and indirectly experienced an application of these technologies in relation to their health. Unfortunately, this type of available information is fragmented since without this information it will not be possible to determine the results in terms of the qualitative improvement of assistance conditions to unattended, isolated populations which are subject to extreme conditions. Here we must consider what “inclusion criteria” should be used for the initiatives, as well as for the inclusion of the type of technology and the modification of health behaviour through the application of these technologies, an aspect which has not always been proven with conclusive results.

For clarity purposes, I will list points resulting from this analysis: First, the projects developed in the sub-regions have a particular condition with regards to their reach since almost all of them are not necessarily oriented towards marginalized or vulnerable populations. We see that even if they have originally been directed towards remote populations or populations in certain conditions with degrees of geographic, social, or health resources isolation, these populations are not necessarily particularly vulnerable.

Secondly, the solutions based on the applications of information and communications technology do not always include a conscientious study of the health needs of the community, resulting in the generation of work with solutions to non-specific problems.

Thirdly, there is a high degree of duplication of efforts along the lines of existing development, resulting in considerable delays in the development of the real solutions required by the communities.

Fourthly, there is no joint strategy on the part the government, the private sector, and local and regional organizations directed towards the regulation and standardization of solutions or models aimed at the incorporation of information and communication technology between the communities of health professionals and users.

Fifthly, the health conditions in Latin America and the Caribbean measured by health and human development indicators have not been properly included in the analysis process which has contributed to differing results.

Sixthly, the incorporation of ICT lacks both qualitative and quantitative impact evaluation instruments.

Seventhly, the majority of the projects do not include a model of economic sustainability, or an organizational model which includes an analysis of the social inclusion and interaction of the technologies.

Eighthly, some of the developments have established distances with the same communities at which they are directed, which has produced a counterproductive effect in terms of the community's adhesiveness and the sustainability of the solutions.

Next, the following table will display the strategies selected by each sub-region for exemplary purposes:

**Sub-Region: Central America**

Country	Strategy or initiative for the application of ICT in health	Actors involved	Community	Type of impact measured
Mexico	Applications of telemedicine, telehealth and long distance education	Anáhuac University. Health professionals and users in geographically unattended areas	Indigenous and peasants from the State of Guerrero	Number of inter-consultations, second opinions, and exams undertaken, satisfaction of the users
Panama	Indigenous. Wireless communication and applications of teleassistance with devices	University of Panama. National Telemedicine Plan	Indigenous. Rural area health professionals.	Preliminary results. Improvement in the health related communications. San Felix Rural Hospital.

**Sub-Region: Caribbean**

Country	Strategy or initiative for the application of ICT in health	Actors involved	Community	Type of impact measured
Jamaica <sup>9</sup>	Educational applications	Health professionals	Rural areas	Assistance support. Videoconferences
Cuba	Hispanic American	Health professionals	Rural areas	Inter-consultation;

<sup>9</sup> <http://www.atalacc.org/brazil05/TelemedicineCaribbean.ppt>. Visited 15 November, 2005.

	Health Link- EHAS			training by videoconferenc e
Dominican Republic	INDOTEL	Ministry of Health, Dominican Telecommunica tions Institute and contractors. Health professionals and communities.	Communities from around 14 Dominican provinces.	Inter- consultations; training by videoconferenc e; Support for pre-hospital medical attention

Sub-region: **South America**

Country	Strategy or initiative for the application of ICT in health	Actors involved	Community	Type of impact measured
Colombia	Amazon Network. National University Tele- medicine network	Health professionals. Government organizations.	Remote regions in the Amazon	Inter- consultation; videoconferenc eswith health and administration personnel
Venezuela	Carabobo University	Health professionals	Communities in remote areas	Attention by tele-medical boats
Ecuador	Equinoccial University. CINTERANDES	Health professionals	Communities in remote areas	Attention by tele-medical boats. Remote assistance support for surgery. Second opinions and inter-

				consultations.
Brazil <sup>10</sup>	Sao Paulo University-USP; Amazon University-UA; Amazon Protection System-SIPAM-Amazon Tele-medicine Zone	Health professionals	Communities in remote areas of the Amazon	Education for professionals, videoconferences, assistance support

The previous experiences in the sub-regions of Latin America and the Caribbean, also allow us to ask the following:

How can we visualize the individual as an active agent in the process of decentralization of health services, mediated by the application of information and communication technology?

Let us look at an example: conventionally an individual has to visit a general practitioner who refers them to a specialist and to prevention service, etc. Now this same individual educated in an environment of the “collective distribution of information, knowledge, and social intelligence” in the access to resources in the sector, uses a group of health services which can be located in their own environment, in an e-kiosk, at a municipal stand or at a telecentre in the area. From there they have access to a distributed environment of primary healthcare which is situated in a distance geographic location but is still within reach of the individual so that they can have shared access to their clinical history, and continuous healthcare records.

The empowered individual will actively intervene in the process and define with their general practitioner at this moment a specialized attention, so that the moment of interaction – supported by an interactive environment – permits active communication between the doctor, patient and specialist. In this way, the application of the specific technology places the different and stratified levels of the prevailing and conventional health structure on the same level, generating an increase and an improvement in the understanding of the health information related to the process. Other health agents can be involved in this way, who through continued community research will have a “community health registry” for health education, prevention and promotion purposes. We could use a more graphic example of how a patient with a diabetic finger of foot or a varicose ulcer, interacts through this medium obtaining attention from the different health professionals required to solve the problem, from the general practitioner to specialists and even nutritionists.

<sup>10</sup> <http://www.uea.edu.br>. Visited 15 November, 2005.

In order to improve access and interaction facilities between users and health personnel and between health personnel themselves such as general doctors, specialists and other health workers, we must have distributed communication and information environments. In this type of strategy it is possible to use people with low levels of schooling (primary level) in work that could be called "eHealth lookout", "observers of eHealth", "eHealth promoters" or "eHealth leaders".

Another question is pose is, if a relevant indicator of community development is infant mortality, how can we reduce the infant mortality rate? The incorporation of information and communication technology will have to contribute to the analysis of the chain of information and events related to the process which results in the death of an infant. Sexual and reproductive education, access to and health resource assistance, and access for pregnant mothers to prenatal care and medical and non-medical professionals will be considered the stages of intervention in the strategy.

### **Conclusions and recommendations of possible central lines of research.**

Information and communication technologies undoubtedly exercise a powerful influence over the way health services are provided, just like the processes of globalization in general terms, which is seen not only in the field of health, but also in industry and commerce. [12]

As possible scenarios for the incorporation of the information and communication technology in Latin America and the Caribbean for the next five years, we can consider the development of the regional policies in the areas of connectivity, telecommunications and economic growth. However, projects of very different calibres, which lack cohesion and a strategic direction with the applications of information and communication technology, are also appearing in the health field.

A better scenario involves directing ourselves to undertake research on the impacts of the incorporation of information and communication technology, especially in the area of Internet and community health, using a regional consensus scheme and the guidance of policy-generating organizations and members. Furthermore this will be done using the different resources without duplicating efforts and without trying to give punctual, sporadic and transitory answers to health problems.

However, from the point of view of the economics of policies of technological inclusion, is it profitable to incorporate ICT into health?

How can a strategy of ICT incorporation be made economically, technologically and socially sustainable in the field of health and in the development of vulnerable Latin American communities?

The answer to these questions forms the basis to consider with regards to the need to research the economic consequences of the technology appropriation process by the populations that do not have adequate resources and find themselves in an unfavourable situation to make decisions on the type of information and communication technology to employ.

The problem is not a lack of “switchings” or of a lack of organizations and serious partners interested in investing in the development of the LAC countries to contribute to social growth. The problem is to make sure the tools that are currently available equally reach health professionals and workers, as well as the users of the health system and citizens in order for these tools to be incorporated into the different aspects of daily life.

As a parameter for the basis of the research considerations, it is pertinent to bring up the results of the last study on the use of the Internet for health purposes carried out by the Health On The Net Foundation (HON). Of the total 1275 respondents 63.76% were English-speaking, followed by 12.47% Spanish-speaking and 2.12% Portuguese-speaking. Of 1291 people, 43.22% were located in the United States, 25.79% in Europe, 4.11% in Canada, and 10.37% in Latin America – 1.08% in Mexico, 0.77% in Central America and 8.52% in South America. Of a total of 1865 people who responded on where they lived, 51.91% said they lived in urban areas, 30.89% in suburban areas and 16.65% in rural areas. Health professionals represented 56.64 of the surveyed, while 43.36% were non-medical. [13]

As possible lines of research, I will now look at the areas of education, technology, markets, sociology, politics and regulation.

Educational Area: in this area, efforts must be focused on two fronts:

Firstly, health professionals need to be oriented to develop an evaluation of impacts of an eHealth education strategy in the Latin America and Caribbean region, involving organizations such as the Panamerican Federation of Faculties of Medicine (Federación Panamericana de Facultades de Medicina FEPAFEM), related centres and the group of health and social protection ministries in the countries.

A second effort should be made to evaluate the development and results of an eHealth community empowerment strategy, to favour the development of educational facilities directed towards vulnerable communities to improve the degree and level of health information and knowledge, and to try to alleviate and balance the asymmetry of information in doctor-patient and health-patient relationships. In this way, it will be possible to actively contribute to health measures and in self-management processes. [14]

In both cases, it is necessary to include health registry, vigilance, and monitoring strategies of the communities with an eHealth focus, orientated towards programs of self-management in the promotion of health and illness prevention. They should include research and evaluation of "Citizen Centred in the Community" strategies, as a step towards strengthening the role of the vulnerable citizen.

Technological Area: incursion of low cost technologies that have the ability to break the digital divide of populations in an unequal state. The aim is to study the conditions of development of a low cost multifunctional platform of wide inter-operability, that has broad facilities and which is accessible through different modalities such as landline telephone, mobile phone, radio frequency and satellite. For these purposes the feasibility of establishing an association of technological centres for the development of interactive web-based facilities to permit the creation of environments of technological convergence must be studied.

Other markets: to orient market actions so that mobile phone companies and information and telecommunications infrastructure become interested in investing in markets with high volume information exchange. To ensure that the most poor sectors of the market have access to mobile phone technology with greater connection ease than at present, in order to take advantage of the development of technological applications. In order to realize the above, economic feasibility assessment must be carried out, as well as studies on the sustainability of low cost wireless communication models.

The establishment of penetration strategies in scenarios of regional commercial trade agreements and trade agreements between regional and more developed countries such as the Free Trade Agreement and MERCOSUR, in which technology inclusion and service provider negotiations are carried out which are linked to application in the communities.

The promotion of the philosophy of international cooperation such as in the case of European projects like @LIS, @Health [15] and others that facilitate the development of virtual communities and interactive environments and the generation of funding for projects.

Sociological and technical area, socio-technical: support the development of research based on the use theory of the applications of information and communication technology, which involves aspects of how social and technical changes are involved in and influenced by the adoption, incorporation, diffusion and display of these applied technologies in the provision of health services. [16]

The development of guiding strategies to re-orient ICT incorporation actions in the assistance processes of health professionals and to make telehealth practices routine and seen as the standard in health assistance

instead of only momentary and passing applications of transitory projects. In order to carry out the above, it is necessary to evaluate mechanisms of incorporation and usability of ICT - especially the Internet - as a platform linked to the processes of information and knowledge exchange for the provision of health services.

Establish permanent interaction with the working groups in the areas of development and project introduction through which practical environments and fields can be made available to evaluate the incorporation of ICT in vulnerable populations. For example, the development of an environment to measure the progressive impact in selected cases, such as in the assistance of displaced populations.

Regulatory and Political Area: Establish a regional study of policy development related to the incorporation of ICT in the different sectors of the economy in LAC countries, specifically in the health sector in order to evaluate the technical, political, social and cultural feasibility of creating a normative framework in the region.

Complementary to the previous lines of investigation, is the generation of a support component to the specific research on the generation of social and economic profitability of the business plans that have arisen from initiatives to incorporate ICT into health. It is important to consider the different perspectives of economic evaluation of technology projects in health and the inclusion of the expectations of the different stakeholders in order to assure better results and a special commitment from each one of the actors involved in the process.

For better results, in governmental health and social protection systems the inclusion of new economic incentive systems for health assistance should be considered in addition to the existing "payers" where the application of technology allows.

Research into the estimated weights of the different transactions directly or indirectly related to the health sectors in LAC which use ICT channels is required. For example, it is important to know the number of transactions, let us say phone calls with a health purpose - be it an telephone inter-consultation made by a user to their doctor or a inter-consultation or second opinion made by a general practitioner to a specialist - through a landline or mobile phone or through a web-based interaction on an Internet platform.

The following scheme, modified by Hainley & Jennet [17], [18] is used to evaluate the different stages of the technology application programs for the provision of services:



Stage of evaluation	Focus	Sources of information
Pilot Study	Local network application	Preliminary cost studies
Initial Routine Use	Local network application/ Diffusion in the health system	Routine. Preferred medications. Price and effectiveness.
Long-term use	Wide jurisdiction/Health system	Long term results. Studies of Health Related Life Quality CVRS

To complete the panorama of evaluation it is necessary that each one of the experiences, with its focus topic, has the impact on the level of social development for each one of the communities with its corresponding level or category of vulnerability. Once the information and communication technologies are defined, it will be time to move onto the evaluation of whether the experiences added value to the processes or not, if they changed the process for the provision of service, if they contributed or not to lessening or alleviating the state of vulnerability, and to carry out the feasibility studies. [19]

As R. Richardson suggests, it is necessary to evaluate and identify the best practices of eHealth, with the purpose of involving decision-makers in the transformation of health systems.

The interdependence of the globalization of health is beginning to be seen in LAC and the application of technological developments opens a path to orient community work in our countries, principally in those countries which are below average.

The group of actions related to the improvement in the healthcare system structures and the incorporation of information and communication technologies that are currently developing in LAC establish an important base for envisioning the state of health assistance in the populations in future years. Children must be the target of the most investment in order to truly favour a transforming force. [20]

The availability of technological mediums at the service of the user and the high levels of use of technology in the health sector will contribute to the creation of ever greater scenarios for an information society.

The regional health policies must be centred on the patient and the community without neglecting the health market forces in a wide system of suppliers.

More than geographic, cultural, social, economic, communication, access and other imaginable barriers, we must transcend the barriers of will in order to create new solutions to existing problems.

The challenge consists of bringing medical and health knowledge to communities with access problems. The incorporation of ICT in health in the broad concept of communities and professionals must be transparent to final users, so that if final users need access to the information from their last medical consultation and need to revise their immunization record, they can do so from their phone by listening to an operator who repeats their vaccination record, or from their mobile phone observing the information displayed onscreen, or from an internet stand in their town.

In conclusion we see that we have the opportunity to use this technology to orient the region towards better health.



In order to support the approaches above, the use of a model which tries to integrate the fundamental elements that must be evaluated for the information and communication technology incorporation processes is proposed. It does so according to the conditions of change in the approaches of interrelation of the individual and their community with the previously established healthcare provision schemes. It also includes the conditions generated by the conditions of categorization of the indices of human development, which correspond to the state of segmentation or fragmentation of the health systems and the resources provided by the connectivity map and the corresponding networked readiness index.

All of these elements intersect in the development of interactive tools and environments that make it easier for the individual and their community according to the development of specific levels of usability.

### **Glossary of some terms of interest**

*Telemedicina: "Telemedicine is the provision of health services, where distance is a critical factor, by professionals that resort to information and communication technology with the goal of exchanging data for diagnostic purposes, to propose treatments and prevent illness and injury, as well as for the permanent training of the health professionals and in research and evaluation activities, with the aim of improving the health of people and the communities they live in." OMS and UIT.*

*Telehealth: Application of telecommunications technology in health, in the broadest sense of the term which includes administrative, informative, and practical clinical applications, and within which the term telemedicine can be included.*

*Teleconsultation: Remote consultation through the use of ICT systems, to competent health personnel. Entails a global concept of medicine, including clinical diagnosis, complementary exams, therapy, etc.*

*Second Opinion: Opinion of an expert on a preliminary diagnosis, which permits a greater degree of certainty, in general accompanied by therapeutic advice and proposals.*

*Telediagnosis: Long distance diagnosis, resulting from a complete consultation in the case of patients that do not have physical access to a consultation, or from a paraclinical exam, providing complementary diagnostic services by specialized personnel to places where they are not available.*

*Teleeducation: There are many applications of remote education in real or recorded time. Teleeducation permits the following to be undertaken from a distance:*

1. Prevention in three of its components: Primary Prevention: Multimedia education, information and prevention campaigns on preventable illness. For example, anti-tobacco education to prevent cancer and cardiovascular disease, etc. Secondary Prevention: Early detection of certain conditions related to the cervix of the uterus. This application is part of the interaction zone between telemedicine and

teleeducation. Tertiary Prevention: Monitoring and action on pathogenic habits of chronic and post-critical patients, in order to reduce the prevalence of the pathological state, the incidence of complication, and setbacks. Generally, with the aim of improving quality of life. For example, the monitoring of a patient after a myocardium heart attack, reducing cardio-pathogenic factors.

2. Curriculum training: Long distance training, continuing education, evaluation and feedback between students and teacher.
3. Continued Medical Training: Accreditation and recertification.

*Telecare: Care of patients in uncomplex health structures, in ambulance units or at home (in this last case it is different from home care) who are remotely assisted by health professionals thanks to the use of ICT applications. The means of communication are generally by network telephone, by satellite and also more recently by wireless telephone, mobile-health and in the future by digital television.*

## Bibliography and References

- [1]. World Health Organization. Towards a World Health Organization eHealth Strategy. EGB/eHealth No. 1. WHO Bulletin.
- [2]. The roads towards an information society in Latin America and the Caribbean. United Nations. Economic Comisión for Latin America and the Caribbean CEPAL. LC/G.2195(CONF.91/3). December 24, 2002. Regional Preparatory Ministerial Conference of Latin America and the Caribbean for the World Summit on the Information Society. Bávaro, Punta Cana, Dominican Republic, 29 to 31 January 2003.
- [3]. [http://www.idrc.org/HarvardForum/10787613581ICTs\\_and\\_Poverty\\_Reduction\\_2-pagers\\_for\\_Harvard\\_Forum\\_2003/](http://www.idrc.org/HarvardForum/10787613581ICTs_and_Poverty_Reduction_2-pagers_for_Harvard_Forum_2003/) Chen Lincoln. ICT4HEALTH. Visited the 19<sup>th</sup> of October, 2005.
- [4]. Roemer John E. The distribution of health: allocation of resources by an international agency. In Nussbaum Martha C., and Sen Amartya. Editors. The Quality of Life. Economic Culture Fund. 1996.
- [5]. Gagnon Marie-Pierre, Cloutier Alain, and Fortin Jean-Paul. Quebec Population and Telehealth: A Survey on Knowledge and Perceptions. TELEMEDICINE JOURNAL AND e-HEALTH. Volume 10, Number 1, 2004. Mary Ann Liebert, Inc.
- [6]. Fortin Jean-Paul, Gagnon Marie-Pierre, Cloutier Alain, and Labbé Françoise. Evaluation of a telemedicine demonstration project in the Magdalene Islands. Journal of Telemedicine and Telecare 2003; **9**: 89–94
- [7]. <http://www.ICAmericas.net> y [http://www.protic.org/proy\\_qry.php?categ=300&menu=1](http://www.protic.org/proy_qry.php?categ=300&menu=1)
- [8]. Urtubey X., Prieto E., Hope H., Rodrigues R., Van West-Charles R. Telehealth in the Americas. ITU, OEA, OPS. 2004
- [9]. Oliveri Nora C., Monteagudo José Luis, Hernandez Antonio, Sandor Tomás. Panamerican Health Organization. Telemedicine.2003. e-health in Latin America and the Caribbean: Trends and Emergent Themes.
- [10]. <http://www.atalacc.org/survey>. Acceso el 29 de octubre, 2005.
- [11]. <http://minproteccionsocial.gov.co/> Resolution 2182 July 9 2004. Visited the 24<sup>th</sup> of October 2005.
- [12]. Jeffrey James. "Globalization, Information Technology and Development". MACMILLAN PRESS LTD. 1999.
- [13]. [www.healthonthenet.org/HON](http://www.healthonthenet.org/HON) Survey - raw data for the Survey 2004-2005.htm. Visited 11/01/05.
- [14]. Wensing Michel and Grol Richard. What can patients do to improve health care? Health Expectations. Volume 1, Number 1, June 1998. pgs. 37-50.
- [15]. European Commission. IST-015886 - @HEALTH Specific Support Action. Project acronym: @HEALTH Project full title: EU-LAM community to foster international cooperation on e-Health applications and technologies. 2005.
- [16]. Lehoux Pascale, Sicotte Claude, Lacroix André. Theory of Use of Telehealth Applications. The Impact of Telemedicine on Health Care Management. M. Nerlich and R. Kretschmer (Eds.). IOS Press, 1999. pgs. 29-38.
- [17]. Hailey David, Jennet Penny. The Need for Economic Evaluation of Telemedicine to Evolve: The Experience in Alberta, Canada. Telemedicine journal and e-Health. Vol.10, No.1, 2004.
- [18]. Policy Implications Associated with the Socioeconomic and Health System Impact of Telehealth: A Case Study from Canada. Telemedicine journal and e-Health. Vol.10, No.1, 2004.

[19]. Base Methodologies for the Evaluation of Feasibility and the Impact of Telemedicine Projects. Martínez A; Rodrigues R; Infante A; Campillo C; Gattini C. Panamerican Health Organization. December 2000.

[20]. Murás Martha, Perczeck Raquel, Minujin Alberto. Childhood and rights or the transforming force. Hewitt Cynthia y Minujin Alberto. Editors. Globalization and Human Rights in Latin America. 1999.